GARDEN AND FOREST.

PUBLISHED WEEKLY BY

THE GARDEN AND FOREST PUBLISHING CO.

OFFICE: TRIBUNE BUILDING, NEW YORK.

Conducted by . . . . . Professor C. S. SARGENT.

ENTERED AS SECOND-CLASS MATTER AT THE POST-OFFICE AT NEW YORK, N. Y.

NEW YORK, WEDNESDAY, APRIL 10, 1895.

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A Notable Park Project in New Jersey.

BEFORE this article is published the people of Essex County, New Jersey, will have decided at the polls whether they will approve of the law passed by the last Legislature of the state, authorizing the expenditure of $2,500,000 for public parks, and at this writing there seems to be practically no opposition to the measure. The natural way in which this public sentiment in favor of parks has been developing for the past twenty years, until it has at last blossomed out into this actual and practical effort, is a most auspicious beginning for the enterprise, and the absence, so far, of any suspicion of self-seeking in the enterprise by any clique or any interest, is an additional encouragement to all its well-wishers. The fact that Newark city is not alone interested, but that the entire cluster of cities and towns within the large and populous county are to be united in the project, establishes a novel precedent in the history of public parks, and since Essex County has little debt the tax will be no burden, while the valuations of property facing the new parks and parkways will be sure to advance sufficiently to more than pay for the improvement.

It is fortunate that the movement has assumed this comprehensive form and that active measures are to begin at once, for not only the city of Newark, but the Oranges, Montclair and other growing towns of that region are spreading out over the country at such a pace that in a short time there will be no rural scenery left for popular recreation. Even now, although the townspeople can ride out to hills on various trolley lines for a single fare, they have little opportunity to come into contact with unspoiled nature, for their walks must be confined to the country roads. Of course, they are shut out from the woods and fields owned by private persons, and, on the other hand, the suburban residents are beginning to complain of annoyances by these throngs, especially on a bright Sunday. It is time, therefore, that some of the beautiful scenery should be set apart and devoted to public use forever. The rolling country in the northern part of the county, the equally beautiful region of wooded hills on its southern border, to the east and west of Short Hills, not to speak of the magnificent slopes of the Orange Mountain, with its unrivaled prospect, including the harbor of New York, offer park land of the most varied and interesting character, and all accessible to a population now counted by hundreds of thousands, and increasing with marvelous rapidity.

The new Park bill authorizes the expenditure of two and a half million dollars, under the administration of five commissioners to be named by the Justice of the Supreme Court of that circuit, and they have full power to condemn land, to receive gifts, to take charge of the necessary roadways, to provide a system of maintenance, to assume control of existing parks, and, in short, to do all that is necessary in a park system in the way of construction and management. There are considerable spaces of land already held by the cities and towns which will be included in this park system, comprising old reservoir sites, lands taken for taxes, ancient commons, gores of land at intersecting highways, and the money authorized will suffice to secure land for three or four large parks in different parts of the county—one, perhaps, on the Orange Mountain, one near the flat Newark meadows, where there is a large factory population, one on the rolling lands west of the Passaic about Belleville and Franklin, and another still to the south, perhaps in the vicinity of Waverly, where the land is also rolling and where there is some water. In addition to the greater park areas and the smaller parcels of lands already possessed, the funds will suffice to secure connecting ways, playgrounds and all the open spaces actually needed, and, besides this, it is believed that many public-spirited citizens will make donations of land where it can be used to round out and complete the park system.

If we were asked to make a suggestion to the commissioners whom Judge Depue is to appoint, we should say that since these parks are situated in different parts of the county, and each one is surrounded by a population with distinct characteristics, the sites should be chosen not only to meet special needs in each case, but they ought to be selected as component parts of one comprehensive plan, so that each one shall be a complement to all the rest and furnish attractive features not offered by the others. Besides this, the usefulness of these parks would be greatly enhanced if broad roadways could be secured to connect them with each other and with what are to-day different cities, but which will be within a few decades different sections of one great city. In this way the practical park area will be largely increased, and the property along these parkways will be greatly enhanced in value, for the most inviting place of residence in the county will be found along their lines.

And this leads to another suggestion, which is, after all, the one of prime importance. Any park will lose half its value, and often more than half its value, unless it is prepared by a skilled designer. No man would think of erecting a building worth two millions and a half without employing the best architect who could be secured, and the parks of Essex County will cost much more than that amount before they are completed. Therefore, a skilled landscape-architect—an artist who has demonstrated his ability to cope with all the problems presented in a work of such magnitude as this—is essential. Morever, the time to call him into consultation is before the ground is bought. It is a well-known fact that has been proved over and over again in the history of parks in all the great cities of the world, that if the designer is called in after the land is bought, he finds certain approaches and modifications of boundaries necessary, and the cost of what is needed afterwards to finish out the whole into a perfect picture is often nearly as much as the cost of the original land, because of the suddenly enhanced value of the property adjoining the site. After Central Park was bought and the plan was made, it took nearly half a million dollars to buy the small square at Fifth Avenue and Fifty-ninth Street, known as the Plaza, which was needed as a vestibule to give the great pleasure-ground some dignity of approach and entrance. The proper way, therefore, is to invite the trained park maker

to advise in the selection of the ground and in fixing its boundaries. It is very plain that these boundaries can be much more intelligently laid when something like a general scheme has been decided upon by the designer. It will cost less money, it will be a safeguard against expensive and ruinous mistakes, and it will enable the city to acquire priceless possessions that otherwise will be lost forever.

Very rarely has a community had so splendid an opportunity for a series of pleasure-grounds. Their design should be entrusted to no one who does not stand in the very front rank of his profession. Let us hope that Essex County will prove herself equal to the occasion.

A California Brook Side.

CALIFORNIA has such a wide variety of soils and climates that its experiment stations are properly distributed about the state, and when the system is complete, one who visits the main outlying stations in succession will traverse a road which varies in altitude from the sea-level to 8,000 feet above it, and make a journey of 3,000 miles before he finishes the circuit. The Chico Forestry Station is in Butte County, in the upper Sacramento valley, and beautifully situated south of Chico Creek. The work there has already been described by our correspondent, Mr. Shinn, and that much of the land hereabout is favorable to tree growth is evidenced by the fact that the famous Hooker Oak, on the grounds of General Bidwell, which was illustrated and described in Garden and Forest, vol. iii., page 606, is only a mile from the station. The illustration on page 145, from a photograph sent by Mr. Shinn, is given to show a characteristic bit of scenery in this neighborhood, the view being taken from a point on Chico Creek. Except in the higher mountains of California, there is usually a less shrubby undergrowth along the brooks than there is in the eastern states, and they are, therefore, less attractive. What strikes the eastern visitor most is the fact that the Alders which often line their banks are large trees instead of shrubs, as they are here, and that our low-growing Willows are also replaced by trees of considerable size. The principal trees in this picture are the Plane-trees or Sycamores, Platanus racemosa, which the early botanical explorers confounded with our Sycamore, Platanus occidentalis, until it was distinguished by Nuttall in 1835. The tree sometimes reaches one hundred and twenty feet in height, with a trunk as much as nine feet in diameter above its broad tapering base, often free of branches for half its height, but more frequently dividing into several secondary stems near the ground, reclining or prostrate for twenty or thirty feet after they separate. The branches of these trees are long, spreading and contorted, making an open round-topped, though irregular, head. It is found in the valleys and along the banks of streams, and is one of the noblest deciduous-leaved trees on the Pacific coast.

Scotch Pine in the West.

OF the various conifers easily obtainable in the commercial nurseries, the Scotch Pine, Pinus sylvestris, has succeeded over a wider area than any other, with the exception of the Red Cedar. It seems to do equally well in Dakota and Kansas, and one of the best wind-breaks that I have seen is made of Scotch and Austrian Pines at Ainsworth, Nebraska, near the one-hundredth meridian, on high dry prairie. These Pines were two years old when planted, nine years ago, and they are now from twelve to eighteen feet high, and average eighteen inches in circumference two feet from the ground. Armstrong is ten miles south of the Niobrara River, and the soil is the usual clay loam of the plains. Notwithstanding the unprecedented drought of last year these Pines made a fair growth and were stocky and vigorous when examined in October.

In the spring of 1888, five hundred Scotch Pines, from eight to fifteen inches high, were received at the South Dakota Agricultural College. The trees were set in nursery rows, cultivated and mulched, and eighty-six per cent. of them grew, the average growth for the season being four inches. The following spring these trees were set in mixed plantation with Silver Maple, Birch and Cottonwood. The transplanting was carefully done, but a poor stand resulted. In October, 1894, the Pines averaged four feet high, the tallest being eight feet nine inches. The average growth for the past dry year was eleven inches. This illustrates very well the action of the Scotch Pine throughout the west. As with most other conifers, it is difficult for it to become established, but once a stand is secured there is no further difficulty.

There are a number of fine Scotch Pines at Arbor Lodge, the home of the Secretary of Agriculture at Nebraska City, Nebraska. One of these measured thirty-two feet in height and five feet in girth, breast-high. Standing in the open it had branched freely near the ground, making a broad spreading crown. At Franklin, in Nebraska, the south tier of counties and near the ninety-ninth meridian west, the Scotch Pine is vigorous, and trees ten years from the seed measured twelve feet high. A tree that had been planted in prairie sod when two feet high, ten years ago, measured fifteen and one-half feet high. It is impossible to imagine a condition of greater drought than prevailed at Franklin last year. When seen in October the land showed no trace of moisture, even in the fields.

Scotch Pine was tried in an experimental planting in the Sand Hills of central Nebraska, but only a few trees lived, but these did not equal the Banksian Pine in growth. The soil of the region is nearly pure sand, raised in high ridges and almost devoid of vegetation, only a few species of the hardiest plants growing on it.

Fine young specimens of Scotch Pine were seen in the suburbs of Denver, where all trees are irrigated. In the rich sandy loam of the Smoky Hill River, at Salina, Kansas, the Scotch Pine flourishes, many large trees growing in the lawns of that pretty prairie town. At Ogallah, on the high dry plains of western Kansas, one Scotch Pine, planted several years ago in the unbroken prairie sod, is growing slowly, but is evidently in perfect health. At the Kansas Agricultural College, Manhattan, the Scotch Pine has not succeeded as well as the Austrian Pine in close plantation. It has grown taller, but does not look as vigorous. However, the comparison is hardly fair, as there are many more Austrian than Scotch Pines in the plat, and the latter are more closely planted.

It is safe to assume that, once the trees have survived their first year in their prairie home, no conifer that has thus far been largely tested gives better results in the west than the Scotch Pine.

Washington, D. C. *Charles A. Keffer.*

Exhaustion of Soil by Trees.

A CORRESPONDENT of *The Country Gentleman* writes as to the comparative exhausting power of different kinds of forest-trees upon the soils where they have grown. He had heard that the Pine-barrens are so called because Pine woods made land barren and that certain native species are poison to land. The letter was referred to Mr. B. E. Fernow, chief of the Forestry Division of the Department of Agriculture, and we quote the main points in his reply:

As far as exhaustion of minerals from the soil is concerned, no fear need be entertained, since forest-trees require only the smallest quantity of the commoner kinds of minerals from the soil, and in addition they return the bulk of these to the soil in a more soluble form by the fall of leaves and twigs; hence they improve the top soil, as is well known. The foliage of some trees decomposes more readily than that of others, and forming a humus of more or less desirable composition, this beneficial effect varies with the species; thus, while the conifers, especially Larch and Spruce, as well as the Beech, are among the greatest improvers of soils, the humus from Catalpas, Black Locust, etc., is of little use, while the foliage of the

Oaks decays but slowly, and hence does less for the improvement of the soil. But the saying that "Red Oak and Black Walnut poison the soil" is probably an overstatement—at least, we have no knowledge that this is really so or any reason to believe it; they are simply less useful in making humus.

Of much more moment to tree-life than the minerals, is the water of the soil, and in respect to the amout of water transpired, trees differ very widely, so that, in general, deciduous-leaved trees may transpire six times as much as coniferous trees. The Pines especially are moderate users of water. These latter are satisfied with such small amounts, that they can occupy the dry sands of the Pine-barrens to the exclusion of other species.

The deterioration of soil under given trees, then, depends upon the rapid exhaustion of the soil moisture. This exhaustion is, however, much less due to the transpiration by the trees themselves, than to the surface evaporation, and this again is dependent upon the amount of shade which the trees exert. Under a dense growth of the shady Beech, Hemlock, Spruce, Sugar Maple, etc., no exhaustion of moisture takes place, while under the light-foliaged Birch or Oak, especially in later life when the crowns become thinned out, the sun reaches the soil readily and much water is evaporated. In addition, if these trees stand alone in a field, the raindrops readily fall through the foliage upon the soil and compact it; thus much less water can percolate and the evaporation from the compacted soil is increased, as every farmer will understand who cultivates his crop in order to reduce evaporation.

As far as influence upon neighboring crops is concerned, trees exert a deleterious influence upon the immediately adjoining portions either by their shade—and some species are shadier than others, hence a difference in degree of effect—or by their competition for moisture. Some kinds, like Cottonwoods, Willows and Elms, require not only more water than others, but their root systems are capable of rapid and enormous extension in search of water, so that their influence is far-reaching. Grape-vines are of the same nature, so that it is almost useless to cultivate in the neighborhood of a vineyard, unless the soil contains a superabundance of moisture.

The taproot trees are less injurious, because they supply themselves from greater depths, while the shallow-rooted ones, like Black Locust, Beech, Spruce, etc., compete on the same level with the annual crops.

The Kerosene Attachment for Spraying Pumps.

IN a brief report of a meeting of the Association of Economic Entomologists, in the last volume of GARDEN AND FOREST, page 480, mention is made of the implement devised by me, by means of which kerosene is mixed with water at the instant it passes through a spraying nozzle, so as to obviate the need of making an emulsion previously. The machine was arranged so that the piston draws on both the water and the kerosene supply at once and mingles the two fluids in correct proportions. Mr. Marlatt, of the Department of Agriculture, stated that the practical working of the machine with him had rendered any application of the oil dangerous to plants, since it was impossible to foretell the percentage of each substance used. In my own work with this attachment every trial but one was satisfactory so far as the destruction of the insects was concerned, nor was there any case where the foliage was injured except in one instance where fifteen per cent. of kerosene was purposely used on the Raspberry. Mr. Marlatt's work, however, has led me to make a more careful study of the apparatus, and I offer here a report of my experiments:

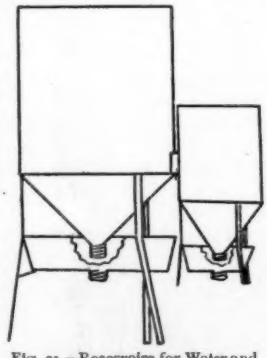

Fig. 21.—Reservoirs for Water and Kerosene attached to force-pumps.

I find that there are two reasons why the apparatus I have used is liable to throw variable quantities of kerosene. The varying level of the two liquids is one, and the fact that the air-chambers of the pump is located directly above the discharge-pipe is another. The first is liable to cause inequality by varying the heights to which the two liquids are lifted; the second by permitting the kerosene to accumulate in the portion of the pump-chamber located above the discharge-pipe, and this accumulation is forced down and out whenever the pressure in the chamber is relaxed. Both of these inequalities are, however, capable of easy remedy by changing the form of the reservoir to hold the liquids, and by altering the relative position of the air-chamber and discharge-pipe of the pump.

For the water reservoir, I used a five-gallon tin can, to which were attached three legs near the top (as shown in figure 21), on which it can stand securely in an inverted position. Then a tin basin was attached to these legs at such a position that when the can is inverted the bottom of the basin hangs an inch and a half beneath the mouth of the can. In the drawing (see fig. 21) the front side of this basin is represented as being cut away to show the mouth of the can. In the centre of the bottom of this basin is soldered a neck to which a screw-cap is fitted. Through this neck the tube of a funnel can be passed, so that it will enter the mouth of the can for filling.

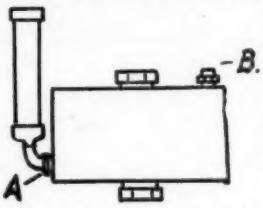

Fig 22.—Improved air-chamber of spray-pump.

Near the top of this can (or near the bottom when in its inverted position) is soldered a staple of heavy tin, to which is attached, by means of a hook, a one-gallon can, with a basin suspended beneath its mouth, as in the larger can, the smaller can being used for kerosene. The kerosene can is hung at such a point that its mouth is on a level with that of the larger can. This arrangement maintains the two liquids at practically uniform levels. The suction pipes are placed in the basins, and the liquids are supplied from the cans as fast as they are drawn out.

The change made in the pump will readily appear in fig. 22, which is intended to show the air-chamber of the Climax pump. The discharge was originally at *A*, and the part of the chamber above this orifice answered as the air-chamber. I attached the discharge at *B*, and extemporized an air chamber at *A* by uniting sections and fittings of gas-pipe. With this arrangement there is no opportunity for the kerosene to accumulate by separation above the discharge-pipe. Should a very little accumulate in the air-chamber, it is not likely to be forced back until after the pumping has ceased.

With this arrangement of the pump and the reservoirs I have secured excellent duplicates in the proportions of kerosene distributed at different times. In these trials a Nixon nozzle, with a fine orifice diaphragm and medium gauze, was used, and a second diaphgram with a fine orifice was added at the union of the hose with the pump, which I find increases the intimacy of the mixture. The stream was permitted to flow for a moment after starting the pump, after which it was directed into graduated glass cylinders of 500 cc. capacity, and three cylinders were filled in each trial, sometimes in immediate succession, and sometimes the spray was directed elsewhere for a time after filling one before it was turned into the next. After the cylinders were filled they were permitted to stand for a few hours for the kerosene to separate from the water. The test was repeated on several different days, and with the cock in the kerosene tube set to throw quantities of kerosene varying from two to twenty per cent. For some unexplained reason, the proportion of kerosene would increase a little until a few strokes had been made on the pump, but after this it remained almost entirely constant, rarely varying more than two or three tenths of one per cent. in the different cylinders in the same trial.

These results are certainly sufficient to show that the difficulties experienced by Mr. Marlatt were due to defective mechanical arrangement, and not to a defective principle.

The cans used in my experiments are not expensive, and if well cared for when not in use should last many years. With a properly constructed pump, and with the exercise of as much care as is necessary in the use of the Bordeaux or Paris green mixture, the apparatus used in my former experiments will give satisfactory results, so far as destroying insects without harm to foliage is concerned. Still I shall hereafter employ the cans, since they insure a uniform distribution of the kerosene. The saving in the cost of the soap over using the kerosene-soap emulsion will soon amount to the cost of the cans, and no one who has tried the mechanical method of combining kerosene and water will dispute the great saving of labor effected by it, as compared with the kerosene emulsion.

Experiment Station, Madison, Wis. *E. S. Goff.*

Foreign Correspondence.

London Letter.

Cœlogyne Micholitzii.—A large number of newly imported plants thus named were sold here by auction this week at the instance of Messrs. F. Sander & Co., with the descriptive statement that this Cœlogyne was discovered by, and named after their collector, Mr. W. Micholitz, who writes that he has one flower-stalk twenty-seven inches long, which has borne seventeen flowers. The dried flowers are described as of large size, pure white and of great substance. In pseudo-bulb, foliage and flower-scape this plant bears a close resemblance to C. barbata, but it appears to be larger in all its parts. It belongs to the section of the genus named Proliferæ by Dr. Lindley, by reason of "a second scaly sheath being often produced beyond the first series of flowers, and out of that sheath arises a second series of flowers." The plants were in good health, and good pieces brought five guineas each.

Dendrobium Apollo is the largest and handsomest of all the hybrids bred from D. nobile. Its parents were D. Ainsworthii splendidum and D. nobile pulcherrimum, and it was raised by Messrs. Cypher & Son, of Cheltenham, perhaps the most successful growers of Dendrobiums in England. A plant of it in flower was exhibited by them last week. It has the habit of a strong D. nobile, and flowers like those of D. Ainsworthii, but the segments are broader and longer, the spread of the flower being fully three inches, while the color is like D. Ainsworthii, but darker in the labellum. This is a plant to be looked after, a truly noble Orchid. No doubt, Messrs. Cypher intend to propagate it as rapidly as possible, and as all the D. nobile hybrids are easy to cultivate, and may be propagated from pieces of pseudo-bulb, we ought not to have to wait long for an adequate supply of the well-named D. Apollo.

Masdevallia melanoxantha.—This is an interesting species, of which an example in flower was exhibited last week by Messrs. F. Sander & Co. It is the true plant as described by Reichenbach some twenty years ago, and not Masdevallia Mooreana, which, however, often does duty for it in gardens, although the two are widely different. A figure of the latter may be seen in the *Botanical Magazine*, t. 7015, and one of M. melanoxantha, the first published, is given in *The Gardeners' Chronicle* for this week (page 359). It has fleshy spoon-shaped leaves, like those of M. Harryana, and erect single-flowered scapes, the flowers being remarkable for their flat black-purple lower sepals, which are united almost to the apex, forming a bilobed body an inch wide and an inch and a half long. The upper sepal is rigid, narrow, at right angles to the lower, and concave at the base. The labellum is hairy. It is quite distinct from all other cultivated Masdevallias, and in attractiveness would rank among the second-rate species.

Phajus amabilis is a worthy companion to P. Cooksoni; indeed, the two might with some reason be called forms of one. The principal difference is in color, the former having flowers of a pale pink color and a dull crimson lip covered with reticulating lines of greenish rose, the outside color being coppery red. It was raised by Messrs. F. Sander & Co. from P. grandifolius and P. tuberculosus, and was awarded a first-class certificate two years ago. There is a good number of plants of it in the St. Albans nurseries, from whence a group of flowering examples were shown last week along with fine flowering specimens of P. Cooksoni and P. Marthiæ. These hybrids are specially valuable, as they have inherited much of the floral beauty of P. tuberculosus, and, at the same time, are as robust in growth and as easy to cultivate as P. grandifolius, which in tropical countries is used as a bedding-plant. I have seen good specimens of it grown in river mud, and magnificent plants of it have been grown in the same soil as and treated with garden Crotons.

Maxillaria sanguinea.—This species was first introduced about four years ago from Chiriqui, and it has since flowered at Kew and elsewhere. A description of it was lately published in the *Kew Bulletin*, and Messrs. F. Sander exhibited it in flower last week. It belongs to the same group as Maxillaria tenuifolia, having a slender rhizome, small ovate pseudo-bulbs an inch long, and grassy dark green leaves about a foot long. Flowers singly on short erect peduncles, an inch across, the sepals and petals brown, the lip crimson, with a few small dark brown spots about the crest and a pale-colored margin. It belongs to the modest wee things among cultivated Orchids, and is quite worth including in good collections.

Gladiolus trichonemifolius is a pretty little species of the same section as G. tristes and G. cuspidatus, which are characterized by small corms and rush-like or subterete foliage. The first named is now nicely in flower at Kew, corms of it having been obtained from the Botanic Garden at Cape Town, an establishment which now trades in rare bulbous and other plants native of that region. There is a poor figure of this Gladiolus in an early volume of the *Botanical Magazine*, compared with which the flowers on the plants now at Kew are much larger and of a softer canary-yellow color. They are borne on slender stems a foot high, and they have almost equal oblong segments spreading to a diameter of two and a half inches. As Mr. Baker says, this species is quite distinct from the other members of the genus in having so regular a perianth, a character which led to Solander classing it with Ixias. Another name for it is G. citrinus. A dozen corms in a six-inch pot make a pretty little specimen when in flower at this time of year.

Sternbergia Fischeriana.—This plant has been introduced into England in quantity by Mr. E. Whittall, of Smyrna, some of whose bulbs are now in flower in pots and in the open border at Kew. It differs from the other species in cultivation in its habit of flowering in spring, and as the flowers are as large as the largest form of Sternbergia lutea and of a brighter yellow color, it is likely to prove a useful plant for the spring garden. There are three or four flowers on each bulb at Kew, and the flowers each last a week or more. The species is mentioned by Herbert in his *Amaryllidaceæ*, but he knew it only from a poor dried specimen. Mr. Baker does not appear to have seen good specimens of it before he published his book on Amaryllids. We have now three good garden Sternbergias, namely, S. lutea, a common plant in south Europe and northern Asia, which Clusius called the autumn-flowering Narcissus; S. macrantha, described by me in the last volume of Garden and Forest as having flowered at Kew from bulbs obtained from Mr. Whittall. This is a superb plant, as will be seen presently from the figure of it shortly to be published in the *Botanical Magazine*. Its flowers are nearly six inches across when wide open under the influence of bright sunlight, and they are of a bright golden-yellow color. The leaves are suberect, glaucous and very similar to those of the common Daffodil. The third is this spring-flowering species.

Snowdrops.—These are beautiful now on our lawns, among the rockery plants and along with the hardy Ferns. Many thousands of bulbs of Galanthus Elwesii were dibbled into the ground last October, and as soon as the thaw came to release them they sprang up quickly everywhere. I think they are most effective among the hardy Ferns, the rich brown of the dead fronds as they rest on the ground being a pleasing contrast to the pure white of the Snowdrops. Fadists who believe in making a species of every plant which deviates slightly from a given type would have no difficulty in finding at least a dozen among these thousands of G. Elwesii. One form in particular is worth notice, its leaves being glaucous and quite an inch wide, while its flowers have outer segments an inch wide and an inch and a half long. Of course, it is only a major form of G. Elwesii. Indeed, there are some who hold that this latter is nothing more than a form of G. plicatus. However, "let him name it who can, its beauty will be the same." Snowdrops are so cheap and they have so great a charm in the early spring, when largely planted on lawns, etc., that

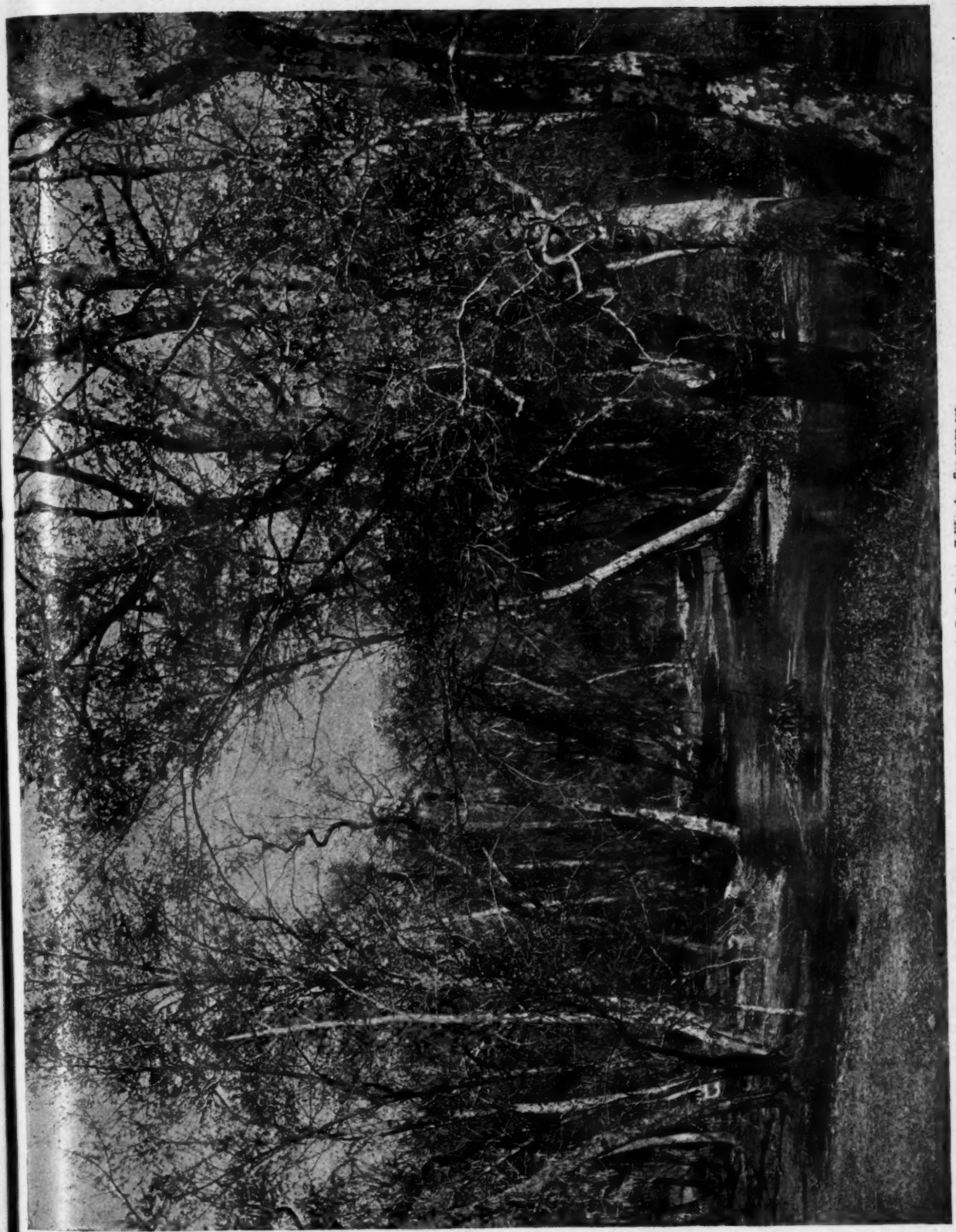

Fig. 23.—View on Chico Creek, Butte County, California.—See page 142.

every good garden should contain them in abundance. Even if they die after flowering every year, they are worth the little outlay in money and labor to renew them each autumn. The same is true of yellow Crocus and blue Chionodoxa, which are as largely employed and are quite as effective here as the Snowdrops. In some gardens these plants will establish themselves and multiply from seeds and offsets, but as a rule they fail to do this. The common yellow Daffodil behaves in the same manner. At Kew it will not live long if left to itself, whereas in some gardens known to me it is as independent of the gardener as the Dandelion.

London. *W. Watson.*

Plant Notes.

Azalea Indica.—This old and well-known plant is now sold as a pot plant in such large quantities at this season of the year that it may be well to call attention to the fact that it has other uses than for Easter decoration. Indeed, there is nothing in the whole list of greenhouse plants more serviceable, more easily grown or more satisfactory. It is nearly hardy and can be safely and cheaply stored in a cold pit from which the frost is barely excluded; thus making it possible, without trouble or much expense, to hold in reserve a stock of plants which may be brought into bloom at any time from December to June, an important matter in greenhouse economy. Most of the plants now on sale are imported from Holland and Belgium; they are carefully trimmed and present a most symmetrical appearance; it is not at all necessary, as is generally the custom, to bestow so much labor and care in preserving these formal figures. The plant is thoroughly good if allowed to grow naturally; wire frames and numerous ties can be dispensed with. There is a method of growing them not generally practiced which simplifies, in a marked degree, the difficulties of handling Azaleas. They are planted out in a bright, sunny border early in May; the soil should be deep, well trenched and full of well-rotted manure; plenty of water should be given all summer—much the same sort of care one would give Carnations, Chrysanthemums or Violets in field-culture. A most vigorous growth will be the result of this treatment, astonishing to one who knows only the ordinary increase in pot-grown plants. If any one shoot obtains an ascendency it must be pinched in; if suckers appear at the base, particularly in grafted plants, they must be removed, but staking in any form or tying is almost wholly unnecessary. In the autumn, late in August or early in September, they are lifted carefully and potted; they should be kept close for a few days and rather warm, after which they may stand in the open air until the nights are too cold, when they should be stored in pits and brought into the greenhouse in successional lots through the winter and spring. The result is not the formal type with which we are so familiar at exhibitions and in choice collections; but it is a healthy plant which looks like an Azalea and nothing else; the foliage is better, larger and deeper green, the flowers are quite as numerous and apparently of better size and texture. These Azaleas are good house plants; if the living-rooms are not too hot they will keep in flower for several weeks; care must be given to watering—if once they become dry it is difficult to restore them; if they can be kept in a cool room, an attic or bedchamber, before and after blooming, they will continue in good condition for years. It is unfortunate that the varieties now offered are largely double or semi-double; much of the grace of the flower is lost in their malformed petals; it is not sufficient compensation that they last a little longer.

Marica cœrulea.—This Iridaceous plant from tropical South America is well worthy of cultivation, though the flowers, as implied by the generic name, are quite fugacious. The plant appears as a flat-clustered mass of sword-shaped leaves from an inch to an inch and a half in width and four feet or more high. The stems on which the flowers are borne at this season are of the same shape, and as wide as the leaves, with a central vein. The flowers are borne from the side of this vein, near the top, on a small expanding stem, and appear in succession. They most strikingly resemble Tigridias in shape, with flat petals of bright lilac, and a depressed bowl, which is lined and striped with brown. This Marica grows well, and flowers regularly in a temperate house.

Iris Rosenbachiana.—This Bokharan plant flowers with the Irises of the Reticulata section, although it is much larger and more showy. Its blooms are the most striking and distinct of the early Irises, and are variable both in size and color, red and blue purples and yellow being the prevailing ones. A very good form, sent to this office by Mr. Gerard, has falls of deep velvety red-purple, shading to a lighter tone of same on the claw, which is striped in two lines of dark color on each side of the bright orange-yellow ridge, which extends to the base. The crests are of an intermediate shade of purple, fading out on the styles, which are white beneath. The standards are small, spoon-shaped, and extend horizontally. The falls are slightly wider than the claws, but appear narrower, as they are partly folded usually. The claws and styles make a long tunnel, and Mr. Gerard observes that the bees, which are now active, have some difficulty in finding the nectar. They are deceived apparently by the open shape of the flower, and search around the base of the styles, neglecting the signals, which point the true way. This Iris belongs to the Juno section, with Iris Persica, etc., and has a white-coated bulb with curious ovoid short roots, which would seem to be inverted offsets. The flowers appear in succession, usually two or three from each bulb, before the leaves. The leaves appear too late to be damaged by the frost, unlike others of the section, such as I. orchioides and I. Caucasica, and yet the more forward foliage of these plants usually suffers little, if at all.

Hyacinthus ciliatus (Muscari azureum).—This deserves high rank among the earliest spring-blooming bulbs. B. M. Watson, Jr., of the Bussey Institution of Harvard University, writes that it was well in bloom during the last week of March in a bed planted with Crocus, Snowdrops, Iris reticulata, Bulbocodium vernum and many varieties of Squills and Chionodoxa; the Crocus Cloth of Gold, Bulbocodium vernum and the Snowdrops were its only companions in braving the cold winds and frosty nights of the season. Grape Hyacinth has been received for several years past from Van Tubengen, Haarlem, but it does not seem to be described by any of the gardening authorities on bulbous plants, nor is it generally offered in the trade lists. It resembles in its general habits of growth and flower the well-known Muscari botryoides; the principal difference is that it blooms fully four weeks earlier and the flowers are much lighter in color, a beautiful robin's-egg blue. It is perfectly hardy and robust. Altogether it is a decided acquisition to our few very early blooming plants, and should be more frequently used.

Cultural Department.

Seasonable Work in the Flower Garden.

AFTER the severity of the past winter, there is not much doubt as to how to prune the hardy Roses, for with us they are killed down to the snow-level, and some lower still, but this has happened before, and the summer crop of bloom has not been much affected in the majority of kinds. Some of the weaker growers are sure to die out after hard winters, and this goes to prove that there are but few really reliable hardy Roses that can be planted in those parts of New England where arctic weather may be expected. A good coat of snow is the best protection, and if this is absent we always put straw round the roots, so that the plants may not be killed to the ground. It is best to cut off all dead wood as soon as possible before the sap begins to move and the buds to swell, pruning off at the same time all weak and useless wood that would not flower the coming season. We like to put on a sprinkling of some good commercial fertilizer and lightly dig it in after the beds are raked over; it helps to give the young buds a good start, and brings fine Roses later as well as good wood for next

year. We find it better to fertilize in spring than later in the season, for later applications have a tendency to produce fall growth that does not mature well, and often gets killed by frost. Besides this, the soluble parts of the chemicals, if applied late in the season, will leach out and wash away after growth is over, while if put on in spring we get its full value in the growth of the plants. Barnyard manures are good for new plantings of Roses, and would be good as a mulch all summer, but where it must be dug in to hide it, we prefer the commercial fertilizers, and avoid disturbing the roots of the Roses as much as possible.

Flowering shrubs need attention at this time; some need pruning back hard, like Hydrangea paniculata, to get good results. We find that this is one of the few shrubs that must be pruned back to a certain distance every year and all weak shoots cut out, and then strong flower-shoots come away; even these are sometimes reduced when too numerous. Nearly all flowering shrubs, however, are best not cut back in this way, or we sacrifice the growth that is to flower later. It is better to prune after the flowering period, if necessary, in all shrubs that flower in early summer. It is painful to see so often in suburban gardens, where the hired man has been round with the knife and reduced all the deciduous shrubs to a regular, or irregular, shape, regardless of the nature of the subject or of the possibilities as to bloom later. Deutzias, Syringas, Pyrus, Wiegelias, Chionanthus and Rhus cotinus are served alike, and the owners go on expecting some day to see a beautiful flowering shrub such as they see in the lists of tree agents.

One of the first things to attend to in spring is to reduce within reasonable limits such perennial plants as have a habit of taking up more room than is allotted to them. There are many good plants that offend in this way, and would soon overrun the garden if left a year or two. Helianthus rigidus, Monarda didyma, Achillea serrata and its variety, the Pearl; some of the Spiræas, as S. lobata and S palmata; most of the perennial Asters and Golden-rods, Boltonias, and some of the Coreopses, such as C. tripteris and C. verticillata—these, and many others which reproduce themselves too freely from seed, must be taken out remorselessly, or other plants of more value will be choked out before the summer is over, and too late to remedy the matter. We have often lost rare plants, not so much on account of their inherent weakness as because of the vigor of their companions. It is the old story over again, simply the survival of the stoutest.

As soon as the soil is in a fit condition to work freely the Pansies will be planted out in the flower garden, and in the mean time they are being kept as cool as possible to prevent the too early bloom that sometimes comes in the frames. The first crop is always the best, and we like to have this in the open ground, and to this end we cover our Pansies in fall with shutters and not sash, no leaves or straw is necessary, for this makes a fine harbor for mice, and when these shutters are taken off at the end of March the plants are in the best order to transplant in the middle of April, and will stand all the cold we get after this time. Last year we had snow on them for several days in the beds, but it did not hurt them a particle. We like to plant Pansies along the margin of the Rose beds; they do well in this rich soil where it is cool and moist; they are past about the time the Roses need to be cleaned up after flowering, and can then be cleared away. We have also a bed of Pansies by themselves each season, and too much cannot be said of these beautiful strains that are now offered at such reasonable rates, more especially those strains that are of French origin, Bugnots and Cassiers, and those known as the Parisian and Trimardeau are the highest development to which the Pansy need be brought.

South Lancaster, Mass. *E. O. Orpet.*

THE work of cleaning up the flower garden after a long winter requires a good deal of care, and only experienced persons should be intrusted with the work. The customary practice of digging over the borders is a bad one, for, no matter how careful we may be, many plants just starting into growth will be injured. To put a spade or a fork into a clump of Narcissus and lift it partly out of the ground, as is often done, before it is seen, does incalculable harm, as growth with these, and all spring-flowering bulbs, commences in early autumn. Roots destroyed now will not be renewed this season. So it is with Pæonies, Delphiniums and all other plants not directly in sight. We find it better to put a mulch on in the autumn, and clear only the loose litter off in spring, breaking the soil only in places where renewals are to be made. A general overhauling, a replanting, and dividing of clumps which have grown too large, every three or four years will be often enough.

A few days ago I was sorry to see a lot of Spiræa Thunbergii and S. Van Houttei clipped "into shape." All flowering wood was cut away. Treated thus, I tried to think what splendid hedge-plants they would make. Those who can get over the idea of mutilation should give them a trial. No spring-flowering shrubs should be pruned in spring-time more than to cut out dead or weak shoots, or any that mar their graceful symmetry of form. Bushes of Rosa rugosa getting too tall, as they will when in masses, might be cut back. These will fill up the breaks quickly, and flower well by the autumn, but it is hard to make up one's mind to do this with such a charming and deliciously scented Rose, especially as it blooms so early.

We find sound wood of Clematis paniculata from ten to twelve feet above the ground, but consider it better to trim it back to within six feet. We also cut out weak shoots, and leave only a spread of the strongest. As it is a rapid-growing climber, it quickly covers a large space, and we have the trellis uniformly covered, where we would have only a congestion of growth at the top if it was left unpruned. Last season we worked in three or four pounds of commercial fertilizer about four feet away from the plants, and were rewarded by the most luxuriant growth ever made. One plant covered over three hundred square feet, and grew to the height of fifteen feet. When pruning the Chinese Wistaria, after it has made all the growth needed, we should select for cutting the long whitish spinous growths, and leave the shorter-jointed, darker-colored wood, which only produce flowers. It is important to make this distinction between ordinary running growths and flowering wood, as many amateurs make the mistake of cutting the latter out. Autumn-flowering shrubs generally bloom on the current year's growth, and may be safely pruned back if getting out of shape or straggly, as will happen in the case of the Rose of Sharon, Hibiscus Syriacus. Hydrangea paniculata grandiflora is another well-known shrub which can be cut back in spring to within two or three eyes of the old wood.

It is too early yet to overhaul the rock garden, but as soon as possible we shall clear up all dead matter and top-dress with a mixture of loam and lawn fertilizer. We use this in preference to common barnyard manure, which is usually full of weed seeds. Some plants will be dead, and against such a misfortune we make a sowing of new or selected kinds every year. Now is a good time to sow seeds of perennials and hardy annuals. Cold frames are best suited for this purpose. They are to be preferred to outside culture for the majority of kinds. Better attention is given in the matter of watering and shading when we have them under our eyes, so to speak. Sweet Peas ought to be sown as soon as the ground can be worked. It is not open here yet. Trenches such as we use for Celery do very well. This gives us a good chance to water thoroughly during dry weather. No plants suffer more from drought and more quickly go out of bloom if neglected. Gladiolus, Crocosmias, Tritonias, Millas, Galtonias, Amaryllis and other summer-blooming bulbs should be planted as early as possible, and the sooner hardy plants of all kinds are put out the better, so as to get them well established before the dry hot weather comes.

Wellesley, Mass. *T. D. Hatfield.*

Nicotiana affinis.

NICOTIANA AFFINIS is a hardy annual now well known in gardens. It grows very vigorously in ordinary soil, attaining a height of three or four feet, and has strong thick roots. It produces rather thin dark green leaves, which decrease in size from the base upward. It produces in abundance tall flowering stems with numerous flowers borne on these at intervals of several inches. These flowers have long narrow tubes with spreading five-lobed corollas. The three upper lobes are crimped backward to the tubes, giving a unique character to the bloom, which is pure white, with a tinge of light green in the tube. Once grown in the garden it usually propagates itself by self-sown seeds, and these furnish often young plants in the late year, which will survive moderate winters. The most annoying limitation of N. affinis is that in the borders in summer the flowers open in the late afternoon and close in the morning, and the plants in midday are not attractive. Lately I have found that this plant is an excellent species for the conservatory and cool greenhouse, when at this time the flowers, curiously enough, do not close in the daytime, so that the plants are continuously attractive and scent the house with a delicate fragrance. As cut flowers they are also useful, and last three or four days perfectly in a warm room. Cut with long stems they have an informal look, and are very effective. They grow readily in a solid bed, and are

equally at home in a pot containing a liberal amount of good soil. N. affinis has also the merit of flowering for a long season, and might be useful to the commercial florist with a local trade, as it will certainly be appreciated by the private grower who enjoys something outside of the ordinary run of greenhouse plants. It is, of course, an inexpensive plant, costing nothing beyond the care of growing.

Elizabeth, N. J. *J. N. Gerard.*

Strawberry Leaf Curl.

DURING the past year some visits have been made to Strawberry-fields complained of for a peculiar wilting of the foliage. The appearance is not easily described, but instead of the foliage remaining fresh and the leaflets horizontal, the latter bend up at the sides, lose their normal green, and assume a dryish and gray appearance. At first sight one cannot but think this behavior is due to a lack of water-supply; but the growers are firm in the opinion that plants in moist places suffer equally with those upon naturally dry ground. Many plants affected with the leaf curl were examined in the field, and nothing could be found at the root sufficient to account for the dried appearance. It was observed that, as a rule, the leaves showing the curl had a spot, sometimes several, upon the leaf-stalk often close to the clasping base. These spots are with an ashy centre and a purple border, and in general appearance resemble the "leaf spot," which, by the way, is usually found upon the leaflets of the same leaves. A microscopic examination drove away all doubt of any difference, and established the fact that the spots are due to Sphærella Fragariæ, and probably cause a checking of the flow of sap, and thereby occasion the dried appearance. Such plants are seriously injured, because the fruit, depending as it does upon the foliage for its growth, must remain small and imperfect. It is not unusual for the fruit-stalk to be spotted like the petioles, and, therefore, such clusters are often worthless.

If the leaf-spot fungus, Sphærella Fragariæ, an old enemy upon the foliage, is the cause of the curling of the foliage, it then brings the question of a remedy for the latter down to that of the eradication of the fungus. This can be done as has been demonstrated by the use of any of several fungicides as mentioned somewhat at length in previous articles upon similar subjects.

Rutgers College. *Byron D. Halsted.*

Rose, Marchioness of Londonderry.—This comes to us as a new Rose of 1893, and it is one of the fine series which has emanated from the nurseries of Messrs. Dickson, of Newtownards, Ireland, during the past few years, and it has the distinction of having won the gold medal of the National Rose Society. It is hardy, with foliage that is at once a recommendation, being similar to that of the Ulrich Brunner, and quite as beautiful. The stems are also without thorns—a desirable feature in any Rose that has to be handled. The flowers are of the largest size, almost six inches across when fully open, of a most delicate shade of pink in the centre, something like that of the Daybreak Carnation, but paler, and shading from the centre to pure white at the edges. In all the English descriptions that we have access to, this Rose is described as pure white, but the pink shade is quite pronounced as grown here, reminding one of the old Souvenir de la Malmaison tint, and, indeed, it would not be surprising to learn that this plant has some influence as one of the parents of the Marchioness of Londonderry. The fragrance is similar also, and it has the smooth wood of the older kind. There seems to be no doubt that this new Rose will prove hardy, and it is listed as a Hybrid Perpetual, which is equivalent to the term Remontant. Both are unhappy terms as applied to outdoor Roses, as they rarely flower but once in a season. For forcing under glass the Marchioness of Londonderry can be highly recommended as being of a rare shade, pleasing, one of the largest Roses known, and as easy to force as Ulrich Brunner.

Those who have seen the new Rose Clio in London speak highly of it as a beautiful new white Rose. It is one of Paul's, and we may expect to hear more of it, since hardy white Roses are scarce.

South Lancaster, Mass. *E. O. Orpet.*

Early-flowering Perennials.—Unless the greatest care is taken in moving this class of plants few flowers should be expected from them the first year, unless they are moved before their spring growth starts and a large amount of soil is taken with them. With every precaution, such plants as our native Dicentras, Spring Beauties, Dogtooth Violets and Trilliums had better be left until they have gone to seed. Some of them, however, like the Trilliums, when set out in early spring, make a better growth the second year than they would do if the transplanting is deferred until autumn, when the leaf-buds have formed. There is a dormant period in the life of many early-flowering plants, especially those with fleshy and bulbous roots, which comes after their stems have died down, when they can be transplanted with little loss of strength. When the plant has begun to make growth in early spring, or when it is left until the autum growth begins, the small roots are broken, and new ones must be formed, and this is always something of a drain upon its vitality.

Madison, N. J. *W. P.*

Correspondence.

The Opening of the Fire Season in Minnesota.

To the Editor of Garden and Forest:

Sir,—From the 15th to the 22d of March forest fires were frequent in the more open parts of Minnesota. The smoke from these so filled the air on the 22d as to make long sights with a surveying instrument impossible. These fires often originate, as has been stated and published many times, through a lack of intelligence on the part of people using fire. I lately noticed an instance that illustrates the effect of the proposed burning of tops after logging. The Eastern Minnesota Railroad Company had evidently instructed their section foremen to burn the brush on their right of way. There were but three men on the section, and with a track heaving by frost, and a great deal of brush along the line, they could not do the work properly. A fire was started in the brush, and the men went to dinner. Coming to the place a half-hour later, I found the fire running rapidly through the adjoining Pine.

In Minnesota most of the railroad companies have large grants of land for sale, and it would be a good policy for these companies to clear and cultivate the land along their tracks, both to illustrate what can be grown on the lands they have for sale and to keep the fires from spreading from their tracks and killing their timber. The evidence that fires started from locomotives last summer can be found along nearly every mile of track, and it must be that stockholders in these companies are not aware that they are doing themselves great damage by letting these fires escape.

Carleton, Minn. *A.*

The Cherokee Rose.

To the Editor of Garden and Forest:

Sir,—The article in your issue for March 20th on the Cherokee Rose encourages me to relate a most satisfactory experience with the same plant. Some two and a half years ago I set Cherokee Roses along a fence consisting of seven barbed wires, some eight inches apart, and therefore about eight feet high. The plants were set at a distance of fifteen feet apart, and grew well, although I took care that they should be trained along the wires. By this process I soon had a fence which is hardly thicker through than the wire, and which is marvelously beautiful as it stretches along the road. It blossomed within the first year after planting, and produced in the second year such a mass of flowers that it seems as if covered in snow. During the past unfortunate winter it was three times badly set back by the frost, and though it showed flowers in the first week of February, a severe frost on the eighth of that month checked it again for weeks, although it was never deprived of its leaves, and as it ran between dead and brown Orange groves it was the one redeeming feature of the landscape, as it is to-day in a much higher degree. During the past three weeks it has made a full growth of new foliage, and the flowers, which came forth sparingly, now cover the fence from top to bottom. I have planted two miles of it, and it not only gives a great deal of pleasure, but it seems to be a fence which, while not thicker than a man's hand, is absolutely secure against man and beast. It has been grown without any trouble, only requiring the first careful training, which the plant easily follows. Later on it will undoubtedly require the cutting out of the older wood. Some of my neighbors flatter me by saying that this is the only instance they have ever seen where a barbed-wire fence has been transformed into a thing of beauty.

Maitland, Fla. *D. F. L.*

Forestry at the Michigan Agricultural College.

To the Editor of Garden and Forest:

Sir,—Michigan has not attempted any work of consequence in forestry, although every dollar intelligently expended in this direction would return to the state in increased value. People take it for granted that nothing can be done to improve forest

interests. No one cares to study forestry, and our legislators, as a rule, oppose all bills which involve expenditures of public money except in relation to matters in which they are personally interested.

A small plat of two acres of trees in rows was started about eighteen years ago on our college farm, and has proved of considerable interest to a few persons. This farm, which originally contained rather more than a square mile, and consisted almost entirely of virgin forest, has been cleared, until now little more than two hundred acres remains of what, by a charitable construction, may be termed woodland. Owing partly, perhaps, to frequent changes of professors of agriculture in the College, who had control of both the cultivated fields and the woodlands, there has been no settled system of management of the forest. During the past winter the State Board of Agriculture conferred with the Professor of Forestry and with the Professor of Agriculture, and it was decided to attempt some systematic improvement of the College woodlands in an unostentatious and inexpensive way. South of one of the two railroads which cross the rear part of the farm is a tract of seventy-five acres, considerably broken by a marsh and many small cat holes. This has been cut over from time to time and in places some of the undergrowth has been killed by fires, while many seedlings and sprouts have been destroyed by cattle and sheep, while the inroads of grass have been encouraged. This area is to be cleared of all woody growths and the land subdued by pasturing and crops, and then the whole plat is to be planted with trees, according to what is recognized as the most scientific practice. Another section of seventy-five acres is more heavily timbered, much of it with Beech and American Elm. A strip on the north-east of a fence adjoining a railroad track has been cleared. This will be pastured by sheep for a year or two and then back-fired in such a way as to help in preventing fires from getting into the woods. The considerable quantity of Oak on this tract was removed four years ago, as the trees were losing rather than gaining in value. A tract of fifteen acres to the north was nearly cleared of timber some years ago, and all the trees larger than a man's arm that remain will be removed, so that the young trees and sprouts can have a good chance to grow evenly and occupy the land. Farther to the north, and separated from this tract by fields in cultivation, is a narrow strip containing fifty-four acres of good land, and here is the best timber standing on the farm. The strip is longest from east to west and slopes to the north adjoining Cedar River. A space four rods wide will be cut north and south through the middle; this will be kept clean and will illustrate one method of preventing the spread of fires, and at suitable times it will be back-fired.

From all this land which is to be retained in forest the old logs and dead brush should be removed or burned in open places. None of it has been pastured, and it contains a fine growth of young timber in variety. The whole tract has been surveyed and staked off into plats of some ten acres each, and a record will be made of the present condition of each and notes will be made of all future operations. Not a conifer can be found, with the exception of a few small Tamaracks, on any of these tracts. Native coniferous trees in variety will be planted in open places which suit them, especially in the narrow strip of a river. It is not expected that each plot will be treated alike. In a few slightly shaded places where the soil is light and dry, seeds of the common Locust will be sown or sprouts planted. We are induced to try the Locust in this way, since a few of these trees growing in our arboretum are now large enough to make good telegraph poles, and yet they are only twelve years old from sprouts.

There are other areas of woodland, one of them a piece of rough new ground which we proposed to turn into woodland, but there is no need to give any further details. My purpose in writing is to show that we are preparing here to have some practical instruction in forestry, and to invite suggestions as to the best method of managing our woodlands.

Agricultural College, Michigan. *W. J. Beal.*

Recent Publications.

A Popular Treatise on the Physiology of Plants. By Dr. Paul Sorauer. Translated by F. E. Weiss. Longmans, Green & Co., London and New York.

This title is not of itself sufficiently descriptive of the book, which is not only a treatise on plant physiology, but a treatise prepared for a special purpose—namely, "for the use of gardeners or for students of horticulture and of agriculture." Professor Sorauer is something of an authority in certain branches of botany, but he was also for years director of an institution for the scientific training of gardeners, and, therefore, in preparing his book he not only aims to describe the various organs of plants, with their functions, but to show how these scientific principles can be put to practical application. Of course, general students of botany will find in the book what is to be expected in a treatise on vegetable physiology, but its primary value lies in the fact that it has been written expressly for students of horticulture, and it constantly sets forth the scientific reasons for the best practice in propagating and cultivating plants. The opening paragraph of the book states that a gardener should not look upon a plant as unchangeable and restricted to a definite form, but as a plastic organism, capable of modification in all its parts. He should, therefore, be acquainted with the various functions of the plant, so that he may know how to regulate the conditions of its life in order to effect such changes as will adapt it most successfully to specific use. He must know the processes and the reasons for them which cause hard roots to become thick and succulent, as in the case of beets, and hard fruits to become large and juicy by an increase of their softer tissue, as in the case of apples and pears, and, in general, how to modify and change, where it is necessary, the normal development of a plant, as well as to cultivate it in its natural form.

Professor Weiss, who translates the book, after undertaking a course of lectures on vegetable physiology at the Botanical Institute in Manchester, England, realized the need of some work which combined science and practice in this natural way, and as there was no such work in the English language he translated Professor Sorauer's book, and thus has laid English students of horticulture under obligations. Now and then we find an apparent lack of familiarity with the very latest discoveries of science. The book, however, may be trusted as substantially accurate, and it has a special value because the practical use of this scientific truth is constantly borne in mind. For example, the author does not simply show what nutritive substances are needed by a plant, but he sets forth in detail the ways in which these should be prepared and administered to serve the best purpose. When it is explained that the roots of plants need air, it is also explained how the soil should be handled to meet this requirement. When the student is told how roots should be treated in repotting and transplanting, the reason for every step is added, and all the ordinary processes in horticultural practices are discussed in the same way. It would be difficult even for a skilled horticulturist to read the chapter on the Philosophy of Pruning, or the one on the Different Methods of Propagating from Shoots, without obtaining some ideas which would help him to do his work more intelligently and efficiently. Altogether, the book can be commended as a thoroughly useful one in a hitherto almost neglected field. It is a matter of regret that Professor Weiss did not go a little beyond mere translation and bring the science of the book thoroughly up to date in every point.

Notes.

Trim plants of Boronia heterophylla, with their bell-shaped little flowers of brilliant carmine or crimson, have become quite common as plants for Easter decoration. It is an Australian shrub, resembling B. elatior, but much neater in habit and more floriferous.

Among the cut flowers now coming from Bermuda are spikes of Gladiolus, most of them being those of the variety Shakespeare. These flowers did not arrive in very good order, but well-flowered spikes arriving in good condition at this season would, no doubt, have some depressing effect on the flower market here.

A dried plant of the new Sweet Pea, Cupid, seeds of which are to be disseminated by Burpee, of Philadelphia, next year, shows that the plant grows about ten inches high, and spreads out into a close bushy head some fifteen inches across and

covered with white blossoms. Of course, the stems of the flowers are not as long as in the climbing Peas, but there are many places where the dwarf plant can be used to advantage, and there can be no doubt that the California paper is correct which declares that it will make an interesting pot-plant.

A Dutch horticultural journal says that an excellent way to preserve fresh nuts is to place them, immediately after gathering, in clean flower-pots, the holes in which have been stopped, and, covering them with a tile or bit of slate, to bury them in the earth until they are needed for use. The main thing is to protect them completely from the action of light.

The delicate and remarkably sweet-scented flowers of Chimonanthus fragrans are often fully open in latitudes south of Philadelphia in February. Mr. Joseph Meehan writes that he has been watching for the appearance of these flowers for some time, and, in his disappointment, has at last examined the shrubs closely, to find that the buds had all been destroyed by the frost, sometimes when they were about half-open. There are flowers on the prostrate stems of Jasminum nudiflorum, but the buds on the upright-growing shoots are still tightly closed.

Professor Wood, while he was a member of the staff of the New Hampshire Agricultural Experiment Station, made some tests with regard to the flow of maple sap which are of interest. Maples are usually tapped to the depth of about an inch, and this practice is based on the belief that the sap comes chiefly from the wood of recent growth, so that any tapping deeper than the layers made during the last six or eight years is useless labor and an unnecessary injury to the tree. Professor Wood's experiment, however, seems to show clearly that the flow of the sap is largely dependent on the depth of the tap, and that sugar-makers may with great profit tap their trees to a depth of four or five inches. The additional injury to the tree is slight, especially if the hole is small, and when a three-eighths of an inch bit is used and the bark is left uninjured, the holes will be grown over the first summer after tapping. It seems that twice the amount of sap can be obtained by tapping four inches deep instead of two, while the sap from deep boring is almost as rich as the other. The exposure of trees to the sun has much to do with the result from tapping on different sides, and there is little doubt as to the correctness of the popular view that the trees should be tapped on the south side wherever practicable.

In a recent lecture, Mr. D. Morris, Assistant Director of the Royal Gardens in Kew, noted the fact that the commerce in vegetable fibres was one of the most important in Great Britain, and that the imports in 1893 amounted in value to forty-five millions sterling, and the export of manufactured goods reached a value of seventy-four millions sterling. Of imports, nearly all the cotton, flax, hemp and paper material came from foreign countries, and it seemed to Mr. Morris a matter of regret that Canada could not become a great flax-producing country, that New Zealand did not improve its phormium production for the higher class of textiles, and that cotton and ramie were not grown in the West Indies. Cellulose is the essential element in all fibre. Cotton, sola pith, ivory nut, linen rags were all cellulose, and in the Kew Museum fragments of linen cloth found between bricks of pyramids erected twenty-five hundred years before Christ, showed that in a dry atmosphere cellulose is practically indestructible. One of the new fibres, especially interesting and quite unknown in Great Britain, is to be seen in a cuirass made from a kind of wild pineapple, and this suit, worn by the Indians of South America, is padded before and behind with vegetable silk from the fruit of the Yachan, Chorisia insigne. By rolling themselves in water the silk swells until the cuirass becomes arrow-proof.

Since the best teachers of science in these times insist that their pupils shall study objects before they receive much instruction from books, instructors of botany find it difficult to procure at any given season of the year enough fresh material to fully illustrate different subjects. In following any text-book, for example, enough specimens to illustrate the different sections of the book as they are taken up at different dates, can rarely be found. To obviate this difficulty, Professor Beal writes to *Science* that he has collected quantities of stamens of different plants, say, the Barberry, Sassafras, Lobelia, Cypripedium, etc, and preserved each kind by itself in a solution of twenty-five per cent. alcohol, or of one of formalin to one hundred of water. These specimens are all ready when the subject of stamens comes to be studied, and the preserved objects can be placed in a small dish before the pupils when fresh specimens cannot be procured. If they are not allowed to dry they can be used for successive classes. In the same way Professor Beal has preserved forms of pistils, the torus and other parts of plants, including fruits of various kinds, such as half-grown plums or cherries, fruits of the Mandrake, Bloodroot, Mulberry, etc., at different stages of growth, and in this way lessons in morphology can be made more impressive than they would be if one illustration was used at one time, and the others a week or a month later.

Among the pears in market the Winter Nelis, with its beautiful gray-russet coat, fine-grained, buttery flesh and rich aromatic juice, is still to be found in limited supply. Easter Beurre, though not so beautiful, is much larger and is always prized for its melting quality and rich flavor, and good pears of this variety now sell for $1.50 a dozen. P. Barry is hardly yet at its best. It is a large and beautiful fruit with a vinous flavor, but its flesh is somewhat stringy, so that it can hardly be called a pear of the very finest quality. It commands as good a price as Easter Beurre, however, and will be the leading pear in the market when all others are past their season. The finest apples here now have been coming from Vermont and have sold for exceptional prices. These have been Newtown Pippins, Northern Spies and a few extra Baldwins. The crop of Washington Navel oranges, from California, is so nearly exhausted that prices have grown rather more firm, and fair fruit sells for $3.50 a box and upward. There are practically no seedling oranges from California in this market. They are met half-way across the continent by West Indian fruit, which commands fully as much in Chicago as the California product. Good Washington Navels retail for sixty cents a dozen, Messina Blood oranges for the same price, and the best Jamaicas for fifty cents a dozen. Almeria grapes, if in large clusters and finely colored, bring fifty cents a pound. In spite of the arrival of the large supply of tomatoes which is coming from southern Florida, Cuba and Bermuda, solid hothouse tomatoes sell for seventy-five cents a pound. String beans, from Florida, bring $8.00 a crate at wholesale, and green peas from the same state bring $5.00. Asparagus is now coming from as far north as North Carolina, and is worth seventy-five cents a bunch. Florida is sending new beets and new cabbage. From Bermuda are coming new beets, carrots, onions and parsley. The best hothouse cucumbers are from Boston, and bring $2.00 a dozen.

Ignatz Forsterman, one of the most enterprising and accomplished of the commercial florists in the vicinity of this city, died at his home in Newtown, Long Island, on the 29th of March. Mr. Forsterman was born in Coblentz, Prussia, in the year 1854, and after studying in the Garden Institute, in his native city, he acquired facility in the practice of his calling in various horticultural establishments of his native country, in Switzerland, France and England. He became specially skilled in the cultivation of Orchids, and by his habits of close observation he acquired a very comprehensive knowledge of these plants and their habits. In the year 1881 he began a series of remarkably successful collecting tours for an English firm, and sent home many new plants from India, the Malayan Archipelago, Burma and other parts of Asia. His knowledge was supplemented by such energy, industry and fearlessness that no labor or hardship discouraged him. The trying climate, however, undermined his strong constitution, and since he settled in this country in 1886 his health has always been delicate. He bore this burden, however, with cheerful courage, and, in spite of many drawbacks, he established a prosperous business, some features of which were absolutely unique. He became a large importer of such Orchids as could be profitably grown for cut flowers, and sold them in quantities to florists who grew them for market flowers, while at the same time he did not allow his collectors to neglect the search for valuable rarities. Among the best-known Orchids which he personally collected was Cypripedium Spicerianum, which he rediscovered; Dendrobium Sanderianum, D. cruentum, Cœlogyne Sanderiana and C. Forstermanii, Cypripedium Sanderiana and many others, besides such interesting plants as Pteris Victoriæ, which has become a universal favorite. Besides these he discovered a number of species and varieties, specimens of which are now locked up in the Reichenbach herbarium.

The death of Mr. Forsterman is a genuine loss to horticulture, but those who knew him best will miss him more for his high moral qualities than for his helpful knowledge in his chosen pursuit. He was a man of singular gentleness of disposition, modest, truthful and unselfish. His ability always commanded respect, while the genuine worth of his character won the esteem of all who knew him.